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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,411

06/04/2007

Hideki Fujii

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01/05/2011

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EXAMINER

JOYCE, WILLIAM C

ART UNIT

PAPER NUMBER

3656

NOTIFICATION DATE

DELIVERY MODE

01/05/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,411	<b>Applicant(s)</b> FUJII ET AL.	
	<b>Examiner</b> William C. Joyce	<b>Art Unit</b> 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2 and 6-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 and 6-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This Office Action is in response to the amendment filed October 21, 2010 for the above identified patent application.

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 2 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Anderson (USP 2,908,152).

Anderson discloses a ball spline comprising: a spline shaft (10) having a plurality of lines of ball rolling faces extending in a longitudinal direction; and a spline nut (11) formed substantially as a cylinder with a hollow hole into which the spline shaft is fitted, having on an inner peripheral surface of the hollow hole load rolling faces opposed to the ball rolling faces of the spline shaft, and being assembled to the spline shaft through a large number of balls (31), and in that the spline shaft has a substantially circular sectional configuration and has in its periphery a plurality of lines of longitudinally extending torque transmission grooves arranged at equal intervals, with the ball rolling faces being formed on side surfaces of land parts situated between the torque transmission grooves, that is, on both sides in the width direction of each torque transmission grooves; and the distance

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between a pair of rows of balls rolling on the ball rolling faces situated on both sides of each of the land parts is set larger than the distance between a pair of rows of balls rolling on the ball rolling faces on both sides of each of the torque transmission grooves.

3. Claims 2 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Anderson (USP 3,143,867).

Anderson discloses a ball spline comprising: a spline shaft (10) having a plurality of lines of ball rolling faces extending in a longitudinal direction; and a spline nut (11) formed substantially as a cylinder with a hollow hole into which the spline shaft is fitted, having on an inner peripheral surface of the hollow hole load rolling faces opposed to the ball rolling faces of the spline shaft, and being assembled to the spline shaft through a large number of balls (45), and in that the spline shaft has a substantially circular sectional configuration and has in its periphery a plurality of lines of longitudinally extending torque transmission grooves arranged at equal intervals, with the ball rolling faces being formed on side surfaces of land parts situated between the torque transmission grooves, that is, on both sides in the width direction of each torque transmission grooves; and the distance between a pair of rows of balls rolling on the ball rolling faces situated on both sides of each of the land parts is set larger than the distance between a pair of rows of balls rolling on the ball rolling faces on both sides of each of the torque transmission grooves.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Teramachi (USP 4,127,309) in view of Komata (JP 06-241228).

Teramachi teaches a ball spline comprising: a spline shaft (8) having a substantially circular sectional configuration, and having in the outer peripheral surface thereof a plurality of lines of longitudinally extending arcuate torque transmission grooves (9) arranged at equal intervals, with the ball rolling faces being formed on side surfaces of land parts (24) situated in between the torque transmission grooves, such that the ball rolling faces are on both sides in the width direction of each torque transmission groove; and a spline nut (12) formed substantially as a cylinder with a hollow hole into which the spline shaft is fitted, having on an inner peripheral surface of the hollow hole a plurality of lines of load rolling faces which are adjacent in the circumferential direction opposed to the ball rolling faces of the spline shaft; a large number of balls (6) rolling while receiving a load in the load region formed whereby the ball rolling faces of the

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spline shaft and the load rolling faces of the spline nut are opposed to each other.

Teramachi does not disclose a distance between a pair of rows of balls rolling on the ball rolling faces situated on both sides of each of the land parts is set larger than the distance between a pair of rows of balls rolling on the ball rolling faces on both sides of each of the torque transmission grooves.

The prior art to Komata illustrates (Fig. 2) a roller spline comprising: a spline shaft (1) having a plurality of lines of rolling faces extending in a longitudinal direction; and a spline nut (5) formed substantially as a cylinder with a hollow hole into which the spline shaft is fitted, having on an inner peripheral surface of the hollow hole load rolling faces opposed to the rolling faces of the spline shaft, and being assembled to the spline shaft through a large number of rollers (21), and in that the spline shaft has a substantially circular sectional configuration and has in its periphery a plurality of lines of longitudinally extending torque transmission grooves arranged at equal intervals, with the rolling faces being formed on side surfaces of land parts situated between the torque transmission grooves, that is, on both sides in the width direction of each torque transmission grooves; and the distance between a pair of rows of rollers rolling on the rolling faces situated on both sides of each of the land parts is set larger than the

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distance between a pair of rows of rollers rolling on the rolling faces on both sides of each of the torque transmission grooves.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the number of grooves formed in the spline shaft of Teramachi with only three rolling bearing grooves spaced about the outer surface of the spline shaft, as taught by Komata, motivation being to minimize the manufacturing cost of the device while providing a predetermined operating capacity for a particular application..

### ***Response to Arguments***

6. Applicant's arguments filed October 21, 2010 have been fully considered but they are not persuasive.

Applicant argues the bearing device of Anderson is configured so the balls only receive clockwise torque in an axial direction of the spline shaft, and the claimed device is configured such that some of the balls receive clockwise torque and some of the balls receive counterclockwise torque. This argument is not commensurate with the scope of the claims. Specifically, the claims do not define the direction of rolling motion of each of the balls. Referring to the claims, it is understood the spline shaft is formed with grooves, each groove having ball rolling faces on each side of the groove. Anderson (USP 2,908,152 or USP 3,143,867) illustrates each groove having ball rolling

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faces on each side of the groove. For example, Anderson (3,143,867) discloses "[I]n the embodiment illustrated, three such grooves are provided and each defines longitudinally extending flanges 14a and 14b along opposite side edges thereof" and "the flanges 14a and 14b are preferably arcuate in cross-section to conform to the contour of the ball elements which engage the same" (column 1, lines 61+).

Accordingly, the prior art device of Anderson anticipates each structural limitation defined by the claims.

Applicant's arguments are not persuasive and the claims stand rejected as described above.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Joyce whose telephone number is (571) 272-7107. The examiner can normally be reached on Monday - Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William C. Joyce/  
Primary Examiner, Art Unit 3656